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If bio-based plastics is the answer, what was the question?

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In the decarbonization of our society, biological feedstocks are promoted for the production of chemicals and materials, notably polymers, in a future sustainable society, and new polymer materials are developed based on monomers based on extracts from biological feedstocks or obtained from fermentation processes (e.g. lactic acid used for PLA). An ambition is thus to make fossil resources superfluous and avoid the CO_2 emission that is associated with their use, if not before at the end of life of the chemical or polymer.

But is the use of bio-based plastics really better for the climate? In order to answer this question, we need to look into the life cycle of the material in its various applications and compare it to the current situation with fossil-based plastics – from the sourcing of resources over production and use to end of life.

Another reason to favor bio-based polymer materials is the issue of plastic waste accumulating in the environment and increasingly exposing ecosystems and humans due to the persistence in the environment. Biodegradable polymers would help avoiding this problem, but is bio-based the same as bio-degradable, and does bio-degradable mean degradable in the environment? The presentation will answer these questions and discuss the relevance of biodegradability of polymer materials in a future circular economy. Strengths and weaknesses of biobased polymer materials relative to their conventional competitors will be highlighted, and the potential of biobased materials to help tackle the challenges that we are facing in terms of climate change and environmental accumulation of plastic waste will be discussed.